

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

PATENT APPLICATION

OF

ROBERT KULAKOWSKI

and

ROBERT MARSHALL

and

GEORGE ROGERS

FOR

WIRELESS SYSTEM FOR BROADCASTING,  
RECEIVING AND SELECTIVELY PRINTING PACKETS OF INFORMATION

Attorneys:  
Grimes & Battersby  
P.O. Box 1311  
3 Landmark Square  
Stamford, CT 06904-1311  
(203) 324-2828

Our File: ATS016USU

FILED-03 SEP 20 2006

**TITLE: WIRELESS SYSTEM FOR BROADCASTING, RECEIVING & PRINTING PACKETS OF INFORMATION**

**1. Field of the Invention**

5           The present invention relates generally to a wireless system for broadcasting, receiving and selectively printing packets of information such as redeemable coupons, messages or virtually any packet of information or graphics and, more particularly, to such a system which comprises method and apparatus for selectively broadcasting such messages through conventional pager network to a network of printer appliances that are adapted to convert such messages to a readable permanent format such as, for example, a printed copy. In its broadest form the subject system in essence creates a universal delivery system for virtually any type of information packet that is currently delivered using conventional means such as the United States Postal Service or overnight delivery service such as Federal Express, etc. One particularly unique application for such system is the broadcasting and generation of redeemable consumer coupons in printed format that can be redeemed by consumers at retail outlets although it should be appreciated that the system of the present invention has applicability in generating virtually any type of printed message.

**2. Description of the Prior Art**

The dispatch of packets of printed information to individual households

including, for example, the transmittal of consumer coupons is well known. Individuals are accustomed to receiving such printed messages from a variety of different sources including, for example, the mail, overnight delivery services, house to house door-hanger crews, private runner services, the print media and  
5 the like. Conventional methods for dispatching and delivering such printed messages to a large number of individual households are limited severely by the need for manually handling and delivering the printed copy. While these vehicles are capable of handling large volumes of messages on a daily basis, the need to manually deliver such messages imposes certain constraints on the system in terms of both cost and delivery time.

TELETYPE  
15 Telecommunications systems for conveying and delivering messages have improved rapidly over the past decade. For example, facsimile systems have become a common method for the distribution of printed messages and other communications. The speed and cost of such facsimile systems are quite favorable when compared with the conventional methods described above. Facsimile transmissions are, however, severely limited in terms of reach and, generally speaking are inappropriate for mass, broadcast messaging. The appeal and utility of such transmissions is also somewhat limited by the requirement and expense of telephone line connections.

20 More recently, the Internet has become a very potent force in delivering printed messages. As with all other forms of delivery systems, however, there

are constraints in terms of reach capability, line connection, and the need for a computer and operating software and auxiliary and ancillary systems. Moreover message recipients must have a certain degree of computer literacy and, most importantly, the user must assume an active role if the printed messages are to be received.

With respect to redeemable coupons, the most common form of distribution of such products is through the print media, i.e., either as a freestanding insert or as part of a print advertisement in a newspaper or magazine. In addition, many coupons are distributed by direct mail. Although this distribution method is slow and very costly, it can be targeted at specific recipient groups through the use of selected mailing lists. This contact approach is used extensively by mail-order marketers, telephone companies, magazine publishers, and insurance or financial service providers.

For the aforementioned reasons, none of these forms of message delivery offer particularly fast and inexpensive distribution of such messages.

## SUMMARY OF THE INVENTION

Against the foregoing background, it is a primary object of the present invention to provide a system for delivering printed packets of information to designated recipients.

It is another object of the present invention to provide such a system that

is capable of delivering such packets at a low cost when compared to manual delivery systems.

It is yet another object of the present invention to provide such a system wherein the delivery time of such packets can be controlled and, further, where  
5 the packet sequencing and dispatching capability is flexible.

It is still another object of the present invention to provide such a system which has a broad and rapid audience reach and which is able to deliver packets of information virtually simultaneously to pre-determined but widely diverse recipient groups.

It is still yet another object of the present invention to provide such a system where the recipient is able to automatically receive a printed copy of the packet of information using a printer appliance.

It is but another object of the present invention to provide such a system that includes means to prevent the packet of information being delivered from  
15 improper or unauthorized copying as well as providing a remote disarming capability for individual printer appliances.

It is but still another object of the present invention to provide such a system in which the packet can be traced to a particular printer appliance.

It is but yet another object of the present invention to provide such a  
20 system that includes a series of printer appliances that require minimal maintenance and attention.

It is another object of the present invention to provide method and apparatus to effect the objects and advantages of such system.

To the accomplishments of the foregoing objects and advantages, the present invention, in brief summary, comprises a new system for originating, transmitting, receiving and printing packets of information directly to consumers through a network of unique printer appliances. Such information may constitute messages, redeemable coupons, advertisements, warnings, appointment reminders, tickets and the like. Since the techniques are essentially electronic in nature, the system eliminates the need to physically handle or deliver such packets that vastly improves its efficiency in terms of delivery cost and time. The severe reach limitations of the facsimile and Internet systems are eliminated since the system of the present invention can operate in a broadcast mode which is optimal for mass message delivery. With the inclusion of innovative communication filters, the system can limit delivery to a single printer appliance, all printer appliances or a select group of printer appliances.

The system of the present invention does not require the installation of new telephone line connections, requires virtually no technology literacy or any active participation on the part of the recipient in actually receiving and obtaining printed copies of the information packets being transmitted. Using a novel printer appliance, packets can be delivered to the home, office, store, or

automobile or virtually anywhere where electrical power is accessible.

TELETYPE  
10  
15  
The present system is characterized by an ability to inexpensively reach a precise target in the marketplace with minimal recipient involvement. The essential transmission methodology is through established national pager networks such as, for example, those operated by Pagenet or Skytel, which are capable of reaching more than 90% of U.S. households. The majority of the remaining audience can be reached by building relays to operators of local pager networks. In addition, the system may work in conjunction with conventional cellular telephone technology such as, for example, Sprint, MCI, etc. as well as with dedicated satellite transmission systems, or from an RF transmitter from a cable tap, satellite dish tap, remote control or other source. Future versions may employ any current or future wireless broadcast, multicast, or narrowcast technology for transmission.

15 Since the audience is accessed in a virtual parallel mode by a broadcasting system, the number of required transmission channels is minimal.

In addition, access/delivery costs are very low, i.e., in the hundredths of a cent for a typical packet, depending upon the size of the audience.

20 Although the system employs a broadcast transmission method, the incorporation of blocking filters enables the system to deliver either a specific packet to an individual appliance or to all or substantially all of the printer appliances as well as virtually everything in between.

One component of the system is a high-performance, upgradable subscriber database such as, for example, those relational type databases provided by Oracle or Informix, containing detailed bibliographic, demographic and other unique subscriber information. Such information can be obtained, for example, from appliance purchase registrations, supplier purchases, warranty activities, subscriber surveys and response information as well as from other sources. This data may be further supplemented with information such as demographic, economic, lifestyle, family formation, interests etc. from a wide gamut of outside sources such as mailing-list vendors, catalog marketers and magazine publishers. The versatility of this database combined with the selectivity of the blocking filters permits extremely precise message targeting based on definable recipient profiles.

A strong advantage of the proposed system is the incorporation of the maintenance-free printer appliances used by proposed recipients of such messages. With such devices, the recipient does not have to assume an active role in the messaging process. There is no need for even minimal technology or computer literacy since the initial setup and subsequent operation are simple and straightforward. So long as the appliance has power and paper, print messages will be automatically received. It is envisioned that most of the messages will be delivered during the night to take advantage of very low traffic on the pager network at such times. Thus, the incorporation of a printer



appliance requiring minimal maintenance and attention is extremely important.

It is contemplated that the system of the present invention will have particular applicability in the promotion and advertising fields, particularly in the distribution and delivery by packaged-goods manufacturers of redeemable coupons. The majority of coupons are presently distributed as newspaper inserts or as part of a print advertisement in a newspaper or magazine. However, the device is capable of transmitting, receiving and printing almost any packet of information or graphics.

Another potential application for the information delivery system of the present invention is for providing alerts to individuals such as, for example, warnings of threatening weather, anticipated driving conditions, road construction activities, lawn watering regulations, wood burning restrictions, airport closings, and the like.

The delivery system may also be used to provide reminders to individuals of appointments such as, for example, medical and dental appointments, car servicing prompts, pick-ups from the cleaners, special event reminders, impending visits from the plumber, electrician, pest control technician, maid-service and the like.

Invoices and statements can also be delivered using the delivery system of the present invention. For example, bills of all types including utilities, telemarketing sales, event tickets, travel tickets, tickets to attractions, loan

repayments, insurance, mortgage etc., may be directly delivered with huge savings in time, labor, postage and envelopes and creative preparation.

In addition, the system can be used for disseminating and printing e-mail messages.

5 Yet another application for the information delivery system of the present invention is to provide confirmations for airplane tickets, hotel reservations, car rentals etc. which had, heretofore, been distributed by mail or other conventional delivery system. Similar savings in overall delivery expense are attainable using the present system.

Other messages that can be distributed include, for example, jokes of the day, recipes, horoscopes, lottery tickets, gambling receipts, and other personal messages.

TELETYPE UNIT

## BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and still other objects and advantages of the present invention will be more apparent from the detailed explanation of the preferred embodiments of the invention in connection with the accompanying drawings, wherein:

FIG. 1 is a flow diagram illustrating the information delivery system of the present invention.

FIG 2 is a perspective view of the printer appliance used in the information delivery system of the present invention.

FIG 3 is a flow diagram illustrating the manner in which the printer appliance of the information delivery system of the present invention operates.

FIG. 4 is a flow diagram illustrating the print processing in the printer appliance of the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, FIG. 1 is a flow diagram describing the information delivery system of the present invention which includes eight major components: (1) a subscriber directory 10; (2) a system control center 20; (3) a message bank 30; (4) a database manager 40; (5) a transmission sequence compiler 50; (6) a bank of modems 60; (7) a transmitter network 70; (8) and a network of printer appliances 80. It should be appreciated that the subscriber directory 10, the system control center 20, the message bank 30, the database manager 40 and the transmission sequence 50 compiler are software modules that may be maintained on one or a plurality of separate but interconnected or networked computer systems. Such computer systems can be microcomputers to mainframes. Certain software functions of certain modules may be incorporated into any of the appliances.

The subscriber directory 10 is a database and maintains records of all system subscribers, i.e., those individual or entities who will receive the messages through the printer appliances 80. The subscriber directory 10 is preferably maintained in a conventional database program such as, for example, Oracle, dBase, Paradox. While flat file database programs may be used, relational databases such as the ones described above are preferred.

The subscriber directory 10 maintains the serial numbers of all the printer appliances 80 that have been released to the market place. The appliance serial

number for such appliances is very significant because it serves as a message destination code or address for directing messages using the system. Through the database manager 40, the serial number can be linked to detailed household information including geographical address and subscriber profile data. The  
5 appliance serial number is always printed on all delivered messages. If a message also serves as a discount coupon or other voucher, the identification of the issuing source can be identified upon redemption. This would, for example, enable a promotion sponsor to track the event and obtain information on the respondents for inclusion in his customer database. A printer appliance owner would have the option to deny use of any of his or her personal information for any use for privacy reasons.

Other data that can be maintained by the subscriber directory 10 includes bibliographic, geographic, demographic, household information, brand preferences, hobbies, spending habits, ailments, and other individual  
15 characterizations.

The subscriber directory may include, for example, information relating to the subscriber's name, address, geographical region, family composition, residence type, income, interests and brand usage. It should, of course, be appreciated that virtually any type of information concerning the subscriber  
20 may be maintained depending upon the particular application. Thus, for example, if the subscriber directory is to be used in conjunction with the delivery

of appointment reminders, information concerning the subscriber's patient number, appointment history and insurance information may be maintained.

The information contained in the subscriber directory 10 can be outputted in print form similar to a regular telephone directory and used by senders in  
5 compiling their message lists. A hard-copy directory might be used, for example, in a medical practitioner's office in preparation of a message list to remind patients of their appointments for the coming week. Large-scale users such as utility companies may be allowed secured direct access to the directory or provided with magnetic tape, diskette or ROM forms for assigning serial number addresses to their invoices.

The subscriber directory 10 potentially has a high commercial value because of the consumer information content and, if desired, may be rented to or shared with manufacturers, direct mail or telephone marketers, per published privacy policies and in accordance with governing laws and proper notification to  
15 users.

The data contained in the subscriber directory 10 may be maintained in any form to facilitate the ability to sort such data and subsequently match the data to corresponding requirements in the printer appliances 82 upon broadcast.

The system control center 20 may be run on most current CPU's including  
20 microcomputers and main frame computers and provides overall management and administration for the entire information delivery system. It is composed of

a computer and associated input/output peripherals incorporating software modules that perform functions such as:

- a. Collecting and accepting new system information such as the serial numbers of additional printer appliances, new messages, and new and updated subscriber profile data.
- b. Relaying and entering new information to the appropriate repositories, e.g., new serial numbers to the subscriber directory 10, messages to the message bank 30 and profile information to the database manager 40.
- c. Editing, updating and generally maintaining the subscriber directory 10, message bank 30, and database manager 40. . .
- d. Providing support to the database manager 40 and transmission sequence compiler 50 in posting and dispatching messages, and tracking sender volumetrics for billing.

Basic utilities to support the above functions generally exist within the management system of modern database products.

The message bank 30 is a table in a database of the type such as, for example, Oracle, dBase, Paradox, etc. The message bank 30 serves as a vast repository for collecting and storing messages pending distribution. It would preferably have a highly versatile data reception capability to permit messages to be received electronically, recovered from storage media such as disk, ROM,

swipe cards or tape, optically scanned from hard copy by barcode or optical character readers or, as a last resort, entered by keyboard.

Upon entry into the message bank 30, the messages are stored in table format of the type illustrated in FIG. 4. The message bank 30 contains the date that the message is to be delivered, the priority of delivery (e.g., urgent), the type of message, (e.g., coupon, warning, advertisement, etc.), the text and graphic of the message, the destination criteria (e.g., national, specific subscribers, selected groups of subscribers, etc.) and whether the message needs to be broken into parts due to its length.

5 The message bank will, on a daily basis, process those messages that are to be delivered during such day. FIG. 5 illustrates the manner in which a sample batch of message may be processed for a particular day. The messages are initially sorted by the date on which they are to be delivered and then by priority. Thus, all urgent messages (e.g., priority 1) would be delivered before increasingly less urgent messages (e.g., priorities 2-0). Messages of a particular priority, e.g., 1 would be delivered in the order that they were initially received by the system.

15 The database manager 40 is a sophisticated system, preferably of the Oracle or Informix genre, due to its need to handle multiple databases including the subscriber directory 10, the message bank 30, and schedule the transmission of messages.



The transmission sequence compiler 50 is a dedicated component with the responsibility for readying message batches so that they can be relayed to the pager network 70 in a controlled and efficient manner. Required tasks for the transmission sequence compiler 50 include sorting and sub-dividing the daily batch into sub-batches for optimal loading to the different modems and prioritizing within these sub-batches to ensure that the messages within the sub-batches are sequenced in accordance with urgency of delivery requirements. An important priority would be, for example, to ensure that early time-zone messages are queued early in the relay process.

The transmission sequence compiler 50 assigns a unique Message Identification Number ("MIN") to each message for subsequent audit tracking. The MIN number represents that number of the batch in which the message was transmitted, e.g., 00001, followed by the Message Sequence Number and the year. Thus, the MIN for Message Sequence Number 152001 which was transmitted in the first batch in the year 1998 would be "0000115200198". The assignment of such a MIN permits the system to automatically track the transmission of each message delivered to the system. It further serves to facilitate tracking of production efficiency, volumetrics, and quality control measures.

The bank of modems 60 is the primary channel for telecommunication

messages to the pager network 70. Conventional off-the-shelf modems such as, for example those provided by U.S. Robotics, Hayes or other conventional modems may be used. The capabilities of everyday modems are improving rapidly with standard transmission rates currently at least 56 KB. The bank of  
5 modems may be replaced by a dedicated cable TV link as the system grows.

Batches of messages from the sequence compiler 50 are telecommunicated by the message bank to the wireless pager network 70 by regular modem-modem interconnection. Such communications are buffered at the network head-end and broadcast as traffic permits. They may be maintained by the network in buffer storage and then transmitted in batches along with other messages or interlaced between other messages. This permits more efficient and convenient transmission and at lower costs than transmission at peak rates.

In certain applications, it may be necessary to install a dedicated traffic monitor, with message storage and retrieval modules, between the bank of  
15 modems 60 and wireless pager network 70. This utility is intended to efficiently integrate the high volume of lengthy print messages into the regular, pager transmission activity.

Major providers of pager networks are PageNet, SkyTel, ComCast and others. In addition to the foregoing, there are a host of regional pager networks  
20 including, for example, Page 2000 by the Southern New England Telephone Company.

It should, of course, be appreciated that the pager network system may constitute virtually any form of wireless broadcast or narrowcast system now known or developed in the future.

In a typical pager network, the messages are transmitted by the modem bank 60 to the wireless pager network 70 where they are amplified and transmitted to a teleport for uplink to the receiving satellite receiver. The messages are then re-broadcast to a plurality of receiver/retransmitter towers which, again, amplify the signals and re-transmit the messages to the network of printer appliances 80.

The network of printer appliances 80 consists of a plurality of individual printer appliances 82, each having a unique serial number for identification purposes. These appliances include normal pager components and circuitry, combined with a thermal printer and enclosed in a case with a lid allowing easy access for paper placement.

A possible rendition of a printer appliance 82 is illustrated in FIG. 2 and a flow diagram of the function of the printer appliance 82 is shown in FIG. 3.

The printer appliance 82 includes a ferrite core antenna 83, a receiver 84, a decoder 85, filter or format generator 86, microprocessor 87 including random access memory 87A, write only memory 87B and an EPROM 87C, a power supply 88 and a printer 89, preferably of the thermal type although, in future years as the prices come down, it may be possible to use ink-jet or other

computer type printers.

It should be appreciated that printers draw considerable wattage so that there is need for a dedicated power supply 88. Such a power supply 88 would preferably be a stand-alone module due to design and operation restrictions as well as economics. The main unit would be fitted with an LED power-on indicator 90 as shown in FIG. 2 so that a user may quickly see that the appliance is in an active mode.

The components of the printer appliance 82 represent the initial preferred embodiment of such device. The printer appliance 82 has inherent processing capabilities beyond simply providing the basic tasks. With additional components and control software, extended functionality can be readily incorporated.

It should be appreciated that the printer appliance may also be upgraded to render it compatible with a cable television delivery system of messages such as the one, for example, described in United States 5,500,681 which issued on March 19, 1996 to Charles P. Jones for Apparatus and Method for Generating Coupons in Response to Televised Offers, the disclosure of which is hereby incorporated herein by reference thereto.

The incorporation of an IR port (not shown) may also be of particular interest because it may be addressed by an intelligent remote control. See, for example, U.S. Patent No. 5,500,681 that describes a method for transmitting

promotional messages via cable television. Alternatively an intelligent remote control may also capture and store the coupon image and, at the user's convenience, be linked via an IR port to the printer appliance to print the coupon message. Communication between the intelligent remote and the printer  
5 appliance may also be accomplished through a RF link.

Incorporation of a display 90 for the printer appliance 82, preferably a LCD, may also serve to facilitate the user interface. It may, for example, flash urgent messages, allow the user to scroll and review messages and provide prompts for error conditions. With additional memory and software upgrades, the recipient may have the choice of visually reviewing the message and selectively printing only those messages that it selected in much the same manner they currently choose which e-mail messages to print.

As a transfer medium, the inclusion of a magnetic stripe or smartcard reader/writer (not shown) into or as an optional attachment to the printer  
15 appliance 82 would also allow portability of the stored message, with subsequent printing done at the user's convenience. It is possible that, for example in the case of discount coupon messages, printers would be available at the retail establishment where the purchase is to be made. Apart from the portability aspect, limiting printing to only specifically authorized printers may add another  
20 layer of security to the process. In future generations of the system, it is possible that coupon messages would never have to exist in print form. Discount

coupons stored on the transfer media may be read at the store checkout station or at an in-store kiosk or display incorporating the appliance and the card reader/writer attachment and the savings applied if the appropriate purchase was made.

5       The entire system is practical and economically viable only if a vast number of printer appliances 82 are installed. Factors that will influence mass acceptance are price, design appeal, available distribution channels, ease of use, minimal user responsibility, and ready message display. While the individual appliances 82 can be of a "basic" nature, as use increases there are many opportunities to add additional functions and features and, possibly, integrate the stand alone appliance into other common household appliances, e.g., radios, televisions, refrigerators, clocks, door chimes, and other popular home electronics.

15       While the system of the present invention is designed to operate in a continuous message-dispatching mode, it is much more efficient if messages are handled in a batch mode. In this manner, a batch would consist of all messages that were due for delivery on any particular day. These daily batches would be transmitted during the late hours of the prior day and early hours of the due date to take advantage of the low network traffic conditions that exist during  
20       sleeping hours.

With reference to FIG. 1, operation of the information delivery system of

the present invention is as follows. The subscriber directory 10 would include the most relevant and current data for a given subscriber. As previously noted, the subscriber directory 10 would include all applicable bibliographic, demographic and user-characteristic information. It may also contain, for example, telephone numbers, health code numbers, social security numbers and other unique numbers that will facilitate the coordination of a PMA serial number to a particular individual or individuals. It is anticipated that the information in the subscriber directory 10 would be updated on a regular basis as new members are added or deleted and as the information relating to a particular member changes. Such data can be inputted either manually or electronically.

Simultaneously, messages that are to be delivered are inputted into the message bank 30 with specific information concerning the message and delivery instructions, e.g., intended recipients, priority, time and date of delivery, etc.

Upon entry of the appropriate message or messages into the message bank 30 and the subscriber information into the subscription directory 10, the system control center 20 and the database manager 40 then reviews all messages stored in the message bank 30 and segregates them based on the date or dates on which they are to be delivered. Those messages that are to be delivered on a particular date would be identified and segregated.

The message is then formatted by the inclusion of detailed text and

graphics if so instructed. It is contemplated that the database manager 40 will include a vast store of graphic templates such as, for example, prior coupon images, invoice and appointment reminder layouts, logos, simple product pictures, clip-art and a wide variety of text fonts. The database manager 40 would also incorporate a dedicated publisher module with access to the template files and a general capability for semi-automatically designing the printed-message layout. The publisher module would assist in the generation of publisher quality material and would include standards logos, clipart and photographs that would be included in the message. In this manner, the message may simply reference a logo or piece of artwork contained in the publisher module that would then substitute the stored artwork or photographs for incorporation into the message.

In the case of manufacturer discount coupons, the industry guidelines require that the coupon be bar-coded using a standard UPC Coupon Code format which permits a retailer to automatically scan the coupon at the checkout register. Basic code information identifies the issuing manufacturer, classifies product type with a group family code, and denotes the coupon value. An appendix code has recently been endorsed in UPC/EAN format that can carry additional information such as offer number, expiration date and household identification. The publisher may include a subsystem that would automatically generate the numbers for the bar codes and embed them in the coupon message.



Prior to release for relay, the message images might require some manual editing in order to optimize the esthetic presentation of the image.

The compiler 50 then compiles all applicable messages for a particular date, puts them in priority order and then readies them for broadcast.

5       Where a specific message such as, for example, a message reminder, is to be transmitted to a single appliance, the message would include the specific serial number of the appliance to which the message is to be directed. Similarly, where messages are to be distributed to all appliances, the message would include a default number common to all active appliances, e.g., 99999.

10       When messages are to be delivered to a profiled group of recipients, the Database Manager 40 would search the database, extract subscribers from the Subscriber Directory 10 matching the specific profile criteria, and then extract the serial numbers of the appropriate appliances from the Subscriber Directory for dissemination to such appliances. It is also possible, especially in the case of promotion or advertising messages that the sender will want delivery to as many recipients as can be reached on his particular roster. This would require that the Database Manager 40 to overlay the customer roster with the Subscriber Directory 10, and extract those serial numbers of the common entries.

15       The final process in preparing the daily batch for transmission requires  
20       that the transmission sequence compiler 50 in FIG. 1 serializes the message code strings in a priority sequence as determined by delivery urgency. Some

messages must be delivered the next day, while others may be carried over to the following day without difficulty. This allows for accommodation if the system becomes capacity stressed or slowed by high network traffic. The daily batch would actually be subdivided before sequence so that the smaller batches may be dispersed amongst many modems and messages and relayed in parallel to the head-end of the pager network 70. Messages will then likely be broadcast by the pager wireless pager network 70 within the normal pager frequency band of 929-932 MHz along with other regular paging message activity.

Messages are then received by all of the printer appliances 82 in the appliance network 80. Functionally the printer appliance 82 operates as follows:

1. The broadcast messages are sensed by the antenna 83 and fed to the receiver 84.
2. The message signal is then pre-amplified and decoded in the CPU.
3. Message acceptance is achieved by the CPU 87 performing a software, password-matching processes. Each particular appliance has at least four levels of passwords, namely: (1) the default appliance serial number (all "9's" to accept and process national messages); (2) the specific appliance serial number (a unique number assigned to each individual appliance); and (3) the private PIN number as defined by the subscriber (for processing of highly secure messages). Each message is codes with one or more of the aforesaid numbers

4. RAM memory 87A is needed by the CPU 87 for performing multiple tasks including, for example, system management, message handling, destination code matching, bar code generation and the like. EPROM 87C would store security information, and in particular the appliance serial number. Information concerning the characteristics of the subscriber would be stored in the write-only memory 87B to protect against loss during a power failure.

FIG. 4 illustrates the critical, message eligibility process that the CPU in the local printer appliance 82 must perform. To determine whether a message is being addressed to a particular printer appliance 82; the CPU interrogates the destination code header. If the Destination Code String is "0" indicating that the message may only be processed by a specific printer appliance or appliances, it then determines whether there is a match with the PMA number being transmitted with that of the appliance. If there is a match, the message is processed. If not, the process is aborted.

Similarly, if the Destination Code String is "1" indicating that only certain appliances with may process the messages, it then compares the identity of the appliance with that of the message. If there is a match to all or a predetermined percentage, the message is then passed on for processing. If there is no match, the process is aborted.

Lastly, if the Destination Code String is "2" indicating that the message is

being transmitted to a specific appliance or appliances having a private key, it looks to match the PMA number of the message with that of the appliance. Standard encryption techniques used in RSA and PGP use a public key/private key encryption. An algorithm in the PMA will decrypt the message, process the  
5 decrypted message and print it out. It can only be decrypted by the PMA with the private key. If there is a match, it then performs a second function by attempting to match the appliance's private PIN number with the PIN number being transmitted. If both match, the message is processed. If not, the process is aborted.

FIG 15 illustrates the manner in which messages within the appliance  
sub 02 may be processed and eventually printed using a message interpretation process. Incoming messages will typically be received in a highly condensed form as the Sequence Compiler has adopted compaction processes such as zipping, zero compression, bit packing and general data compression. The CPU  
15 must then decode and decompress the message content.

As previously discussed, in order for a Pager-Network provider to handle the message in a normal manner, the message must be contained within a specified packet length or, alternatively, will be packetized over multiple packets. Some messages, particularly coupons, will include significant graphic  
20 content and the total message may have to be transmitted in the form of a packet series. This necessitates inclusion of a pre-content header indicating the

number of parts to the message. A byte indicator packet, for example 1 of 3, would serve to alert the system that the message is not complete until all three parts have been received and that the CPU will need to merge the packet contents and reconstruct the total page prior to generating print code.

5        Having thus described the invention with particular reference to the preferred forms thereof, it will be obvious that various changes and modifications can be made therein without departing from the spirit and scope of the present invention as defined by the appended claims.

NOVEL